VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Amended) [Filtering] A filtering method [adapted to transform] for transforming an input digital signal [(X_n)] into one or more output digital signals [(y_n)] having even-indexed samples [(y_{2n})] and odd-indexed samples [(y_{2n+1})], said method including at least one iteration [(506) which contains] comprising the steps of:

[- an operation of] modifying the even-indexed samples [(y_{2n})] by a function [(R)] of weighted odd-indexed samples [($\alpha_{0,j} \cdot y_{2n+mj}$),]; and

[- an operation of] modifying the odd-indexed samples [(y_{2n+1})] by a function [(R)] of weighted even-indexed samples [($\beta_{0,j} \cdot (y_{2n} - y_{2n+2})$)],

[said] wherein the weighted samples [being] are obtained by at least one weighting operation[,

said method being characterised in that at least one of said weighting operations is] applied to [the] a difference between two consecutive even-indexed samples.

2. (Amended) [Filtering] A filtering method according to Claim 1, [characterised in that] wherein said [operation of] step of modifying the odd-indexed samples [(y_{2n+1})] is performed [following] after said [operation of] step of modifying the even-indexed samples [(y_{2n})].

3. (Amended) [Filtering] A filtering method according to Claim 1 or 2, [characterised in that] wherein said iteration [(506) consists notably of] further comprises:

[-] weighting, by [means of] a first weighting coefficient [($\alpha_{0,j}$)], at least one odd-indexed sample [(y_{2n+mj})] adjacent to an even-indexed sample currently being modified, so as to obtain a weighted odd-indexed sample [($\alpha_{0,j} \cdot y_{2n+mj}$),];

[-] modifying at least one even-indexed sample [(y_{2n})] using the at least one weighted odd-indexed sample [($\alpha_{0,j} \cdot y_{2n+mj}$),];

[-] weighting, by [means of] a second weighting coefficient [($\beta_{0,j}$)], even-indexed samples [(y_{2n}-y_{2n-2})] adjacent to an odd-indexed sample currently being modified, so as to obtain weighted even-indexed samples[($\beta_{0,j} \cdot (y_{2n} - y_{2n+2})$)]; and

[-] modifying at least one odd-indexed sample [(y_{2n+1})] using at least one weighted even-indexed sample [($\beta_{0,j} \cdot (y_{2n} - y_{2n+2})$)].

4. (Amended) [Filtering] A filtering method according to [the preceding claim] Claim 3, [characterised in that] wherein the second weighting coefficient [($\beta_{0,j}$)] is a function of the first weighting coefficient [($\alpha_{0,j}$)].

5. (Amended) [Filtering] A filtering method according to [the preceding claim] Claim 4, [characterised in that] wherein the second weighting coefficient [($\beta_{0,j}$) depends

on] is a function of the first weighting coefficient [($\alpha_{0,j}$)] as follows:

$$\beta_{0,j} = m_j / \left(1 - 2 \sum_{i=0}^{j} \alpha_{0,j} \right)$$

where $\alpha_{0,j}$ designates the first weighting coefficient, $\beta_{0,j}$ designates the second weighting coefficient, i and j are integers, [and] m_j is a value defined by [the] a recurrence $m_0=(-1)^{L_0}$ and $m_j=-m_{j-1}$, and L_0[being] is a predetermined integer.

6. (Amended) [Filtering] A filtering method according to [any one of the preceding claims, characterised in that,] Claim 1, wherein at each iteration,[the] an odd-indexed sample [($y_{2n}+m_j$)] adjacent to [the] an even sample currently being modified is alternately [the] a sample of rank immediately below [(y_{2n-1})] or immediately above [(y_{2n+1})] the adjacent even sample.

7. (Amended) [Filtering] A filtering method according to [any one of the preceding claims, characterised in that it includes] Claim 1, further comprising, at the end of said iteration [(506)], an additional step of filtering [step (508) including an operation of] that includes weighting by [means of] a third weighting coefficient [(γ)].

8. (Amended) [Filtering] A filtering method according to [the preceding claim, characterised in that] Claim 7, wherein the third weighting coefficient [(γ)] is a function of the weighting coefficient used [at] in the preceding step, as follows:

$$\gamma = -1 / \left(2\beta_{0,L_0-1}\right)$$

where γ designates the third weighting coefficient, L_0 is a predetermined parameter and β_{0,L_0-1} designates the weighting coefficient used [at] in the preceding step.

9. (Amended) [Filtering] A filtering method according to [any one of the preceding claims, characterized in that] Claim 1, wherein the digital input signal [(X_n)] represents an image.

10. (Amended) [Filtering] A filtering method [adapted to transform] for transforming one or more input digital signals [(y_n)] into an output digital signal [(X_n)], [said] the input signals including even-indexed samples [(y_{2n})] and odd-indexed samples [(y_{2n+1})], said method including at least one iteration [(618) which contains] comprising the steps of:

[- an operation of] modifying odd-indexed samples [(X_{2n+1})] by [means of] a function [(R)] of weighted even-indexed samples[($\beta_{0j}\cdot(X_{2n} - X_{2n+2})$),]; and

[- an operation of] modifying even-indexed samples [(X_{2n})] by [means of] a

function [(R)] of weighted odd-indexed samples[($\alpha_{0,j}\cdot(X_{2n+mj})$)],

[said] wherein the weighted samples [being] are obtained by [means of] at least one weighting operation[,

said method being characterised in that at least one of said weighting operations is] applied to [the] a difference between two consecutive even-indexed samples.

11. (Amended) [Filtering] A filtering method according to [the preceding claim] Claim 10, [characterised in that] wherein said [operation of] step of modifying even-indexed samples [(X_{2n})] is performed [following] after said [operation of] step of modifying odd-indexed samples [(X_{2n+1})].

12. (Amended) [Filtering] A filtering method according to Claim 10 or 11, wherein [characterised in that] said iteration [(618) consists notably of] further comprises steps of:

[-] weighting, by [means of] a [fourth] first weighting coefficient [($\beta_{0,j}$)], even-indexed samples [(X_{2n}-X_{2n+2})] adjacent to an odd sample currently being modified, so as to obtain weighted even-indexed samples [($\beta_{0,j}\cdot(X_{2n} - X_{2n+2})$),];

[-] modifying at least one odd-indexed sample [(X_{2n+1})] using at least one weighted even-indexed sample [($\beta_{0,j}\cdot(X_{2n} - X_{2n+2})$),];

[-] weighting, by [means of] a [fifth] second coefficient [($\alpha_{0,j}$)], at least one odd-indexed sample [(X_{2n+mj})] adjacent to an even sample currently being modified, so as to obtain a weighted odd-indexed sample[($\alpha_{0,j} \cdot (X_{2n+mj})$),]; and

[-] modifying at least one even-indexed sample [(X_{2n})] using at least one weighted odd-indexed sample [($\alpha_{0,j} \cdot (X_{2n+mj})$)].

13. (Amended) [Filtering] A filtering method according to [the preceding claim] Claim 12, [characterised in that] wherein the [fourth] first weighting coefficient [($\beta_{0,j}$)] is a function of the [fifth] second weighting coefficient [($\alpha_{0,j}$)].

14. (Amended) [Filtering] A filtering method according to [the preceding claim] Claim 13, [characterised in that] wherein the [fourth] first weighting coefficient [($\beta_{0,j}$) depends on] is a function of the [fifth] second weighting coefficient [($\alpha_{0,j}$)] as follows:

$$\beta_{0,j} = m_j / \left(1 - 2 \sum_{i=0}^{j} \alpha_{0,j} \right)$$

where $\alpha_{0,j}$ designates the [fifth] second weighting coefficient, $\beta_{0,j}$ designates the [fourth] first weighting coefficient, i and j are integers, [and] m_j is a value defined by [the] a recurrence $m_0=(-1)^{L_0}$ and

$m_j=-m_{j-1}$, and L_0 [being] is a predetermined integer.

15. (Amended) [Filtering] A filtering method according to [any one of Claims] Claim 10 [to 15], [characterised in that] wherein, at each iteration, [the] an odd-indexed sample [$(x_{2n}+m_j)$] adjacent to [the] an even sample currently being modified is alternately [the] a sample of rank immediately below [(x_{2n-1})] or immediately above [(x_{2n+1})] the adjacent even sample.

16. (Amended) [Filtering] A filtering method according to [any one of Claims] Claim 10 [to 15], [characterised in that it includes] further comprising, prior to said iteration [(618)], an additional step of filtering [(614) including an operation of] that includes weighting by [means of] a [sixth] third weighting coefficient [(γ)].

17. (Amended) [Filtering] A filtering method according to [the preceding claim] Claim 16, [characterised in that] wherein the [sixth] third weighting coefficient [(γ)] is a function of the weighting coefficient used [at] in the following step, as follows:

$$\gamma = -1 / \left(2\beta_{0,L_0-1}\right)$$

where γ designates the [sixth] third weighting coefficient, L_0 is a predetermined parameter and

β_{0,L_0-1} designates the weighting coefficient used [at] in the following step.

18. (Amended) [Filtering] A filtering method according to [any one of Claims] Claim 10 [to 17], [characterised in that] wherein the digital [input] output signal [(X_n)] represents an image.

19. (Amended) [Filtering] A filtering method according to [any one of the preceding claims] Claim 1 or 10, [characterised in that the] wherein said modification [operations] steps [consist of] comprise applying an approximation function [(R)].

20. (Amended) [Filtering] A filtering method according to [the preceding claim] Claim 19, [characterised in that] wherein the approximation function [(R)] is [the] an identity function.

21. (Amended) [Filtering] A filtering method according to Claim 19, [characterised in that] wherein the approximation function [(R)] is a function of a real variable which supplies the closest integer to the variable.

22. (Amended) [Filtering] A filtering method according to Claim 19,

[characterised in that] wherein the approximation function [(R)] is a function of a real variable which supplies the first integer below the variable.

23. (Amended) [Filtering] A filtering method according to Claim 19, [characterised in that] wherein the approximation function [(R)] is a function of a real variable which supplies the first integer above the variable.

24. [Filtering] A filtering method according to Claim 19, [characterised in that] wherein the approximation function [(R)] is a function of a variable decomposed into sub-variables whose sum is equal to the variable, which supplies a sum of approximate values of the sub-variables, each of the approximate values of the sub-variables being[,] (i) either a function of a real variable which supplies the integer closest to the variable, [or] (ii) a function of a real variable which supplies the first integer below the variable, or (iii) a function of a real variable which supplies the first integer above the variable.

25. (Amended) [Signal] A signal processing device [(10)], [characterised in that it has] comprising means adapted to implement a filtering method according to [any one of the preceding claims] Claim 1 or 10.

26. (Amended) [Digital filtering] A digital filtering device adapted to transform an input digital signal [(X_n)] into one or more output digital signals [(y_n)] containing even-indexed samples [(y_{2n})] and odd-indexed samples [(y_{2n+1})], said filtering device [having] comprising:

[-] at least one weighting module[,]; and

[-] means for modifying even-indexed samples [(y_{2n})] by [means of] a function [(R)] of weighted odd-indexed samples [($\alpha_{0,j} \cdot y_{2n+mj}$)],

[said] wherein weighted samples [being] are supplied by said at least one weighting [means] module, said modification means functioning iteratively, so as to modify even-indexed samples [(y_{2n})] at least once and then odd-indexed samples [(y_{2n+1})] at least once, and [said filtering device being characterised in that] said at least one [of said] weighting [means] module receives as an input the difference between two consecutive even-indexed samples.

27. (Amended) [Filtering] A digital filtering device according to [the preceding claim] Claim 27, [characterised in that] wherein said means for modifying odd-indexed samples [(y_{2n+1}) are] is disposed downstream of said means for modifying even-indexed samples [(y_{2n})].

28. (Amended) [Filtering] A digital filtering device according to Claim 26 or

27, [characterised in that it has] further comprising:

[-] means for weighting, by [means of] a first weighting coefficient [($\alpha_{0,j}$)], at least one odd-indexed sample [(y_{2n+mj})] adjacent to an even sample currently being modified, so as to obtain a weighted odd-indexed sample [($\alpha_{0,j} \cdot y_{2n+mj}$),];

[-] means for modifying at least one even-indexed sample [(Y_{2n}) from] using at least one weighted odd-indexed sample [($\alpha_{0,j} \cdot (Y_{2n+mj})$,];

[-] means for weighting, by [means of] a second weighting coefficient [($\beta_{0,j}$)], even-indexed samples [(y_{2n}-y_{2n+2})] adjacent to an odd sample currently being modified, so as to obtain weighted even-indexed samples [($\beta_{0,j} \cdot (y_{2n} - y_{2n+2})$),]; and

[-] means for modifying at least one odd-indexed sample [(y_{2n+1})] using the at least one weighted even-indexed sample [($\beta_{0,j} \cdot (y_{2n} - y_{2n+2})$)].

29. (Amended) [Filtering] A digital filtering device according to [the preceding claim] Claim 28, [characterised in that] wherein the second weighting coefficient [($\beta_{0,j}$)] is a function of the first weighting coefficient [($\alpha_{0,j}$)].

30. (Amended) [Filtering] A digital filtering device according to [the preceding claim] Claim 29, [characterised in that] wherein the second weighting coefficient [($\beta_{0,j}$) depends on] is a function of the first weighting coefficient [($\alpha_{0,j}$)] as follows:

$$\beta_{0,j} = m_j / \left(1 - 2 \sum_{i=0}^{j} \alpha_{0,j} \right)$$

where α_{0j} designates the first weighting coefficient, β_{0j} designates the second weighting coefficient, i an j are integers, [and] m_j is a value defined by [the] a recurrence of $m_0=(-1)^{L_0}$ and $m_j=-m_{j-1}$, and L_0 [being] is a predetermined integer.

31. (Amended) [Filtering] A digital filtering device according to [any one of claims] Claim 26 [to 30], [characterised in that] wherein, at each iteration, [the] an odd-indexed sample [(y_{2n+mj})] adjacent to [the] an even sample currently being modified is alternatively the sample of rank immediately below [(y_{2n-1})] or immediately above [(y_{2n+1})] the adjacent even sample.

32. (Amended) [Filtering] A digital filtering device according to [any one of Claims] Claim 26 [to 31], [characterised in that it has] further comprising additional filtering means including means of weighting by [means of] a third weighting coefficient [(γ)].

33. (Amended) [Filtering] A digital filtering device according to [the preceding claim] Claim 32, [characterised in that] wherein the third weighting coefficient [(γ)] is

a function of the weighting coefficient used upstream of said additional filtering means, as follows:

$$\gamma = -1/\left(2\beta_{0,L_0-1}\right)$$

where γ designates the third weighting coefficient, L_0 is a predetermined parameter and β_{0,L_0-1} designates the weighting coefficient used upstream of said additional filtering means.

34. (Amended) [Filtering] A digital filtering device according to [any one of Claims] Claim 26 [to 33], [characterised in that] wherein the input digital signal [(X_n)] represents an image.

35. (Amended) [Digital] A digital filtering device adapted to transform one or more input digital signals [(y_n)] into an output digital signal [(X_n)], [said] the input signals containing even-indexed samples [(X_{2n})] and odd-indexed samples [(X_{2n+1})], said filtering device [having] comprising:

[-] at least one weighting means[,];

[-] means for modifying odd-indexed samples [(X_{2n+1})] by [means of] a function of weighted even-indexed samples [$(\beta_{0,j}\cdot(X_{2n} - X_{2n+2}))$,]; and

[-] means for modifying even-indexed samples [(X_{2n})] by [means of] a function [(R)] of weighted odd-indexed samples[($\alpha_{0,j} \cdot X_{2n+mj}$)],

wherein said weighted samples [being] are supplied by said at least one weighting means, said modification means functions [functioning] iteratively, so as to modify odd-indexed samples [(X_{2n+1})] at least once and then even-indexed samples [(X_{2n})] at least once, and

[said filtering device being characterised in that at least one of] wherein said at least one weighting means receives as an input the difference between two consecutive even-indexed samples.

36. (Amended) [Filtering] A digital filtering device according to [the preceding claim] Claim 35, [characterised in that] wherein said means for modifying even-indexed samples [(X_{2n}) are] is disposed downstream of said means for modifying odd-indexed samples [(X_{2n+1})].

37. (Amended) [Filtering] A digital filtering device according to [Claim] Claims 35 or 36, [characterised in that it has] further comprising:

[-] means for weighting, by [means of] a [fourth] first weighting coefficient [($\beta_{0,j}$)], even-indexed samples [(X_{2n}-X_{2n+2})] adjacent to an odd sample currently being modified, so as to obtain weighted even-indexed samples [($\beta_{0,j} \cdot (X_{2n} - X_{2n+2})$),];

[-] means for modifying at least one odd-indexed sample [(X_{2n+1})] using at least one weighted even-indexed sample [($\beta_{0,j}\cdot(X_{2n} - X_{2n+2})$),];

[-] means for weighting, by [means of] a [fifth] second coefficient [($\alpha_{0,j}$)], at least one odd-indexed sample [(X_{2n+mj})] adjacent to an even sample currently being modified, so as to obtain a weighted odd-indexed sample [($\alpha_{0,j}\cdot(X_{2n+mj})$)]; and

[-] means for modifying at least one even-indexed sample [(y_{2n})] using at least one weighted odd-indexed sample [($\alpha_{0,j}\cdot(X_{2n+mj})$)].

38. (Amended) [Filtering] A digital filtering device according to [the preceding claim] Claim 37, [characterised in that] wherein the [fourth] first weighting coefficient [($\beta_{0,j}$)] is a function of the [fifth] second weighting coefficient [($\alpha_{0,j}$)].

39. (Amended) [Filtering] A digital filtering device according to [the preceding claim, characterised in that] Claim 38 wherein the [fourth] first weighting coefficient [($\beta_{0,j}$) depends on] is a function of the [fifth] second weighting coefficient [($\alpha_{0,j}$)] as follows:

$$\beta_{0,j} = m_j / \left(1 - 2 \sum_{i=0}^{j} \alpha_{0,j} \right)$$

where $\alpha_{0,j}$ designates the [fifth] second weighting coefficient, $\beta_{0,j}$ designates [a] the

[fourth] first weighting coefficient, i and j are integers, [and] m_j is a value defined by [the] a recurrence $m_0=(-1)^{L_0}$ and $m_j=-m_{j-1}$, and L_0[being] is a predetermined integer.

40. (Amended) [Filtering] A digital filtering device according to [any one of Claims] Claim 35 [to 39], [characterised in that] wherein, at each iteration, an [the] odd-indexed sample [(X_{2n+mj})] adjacent to an [the] even sample currently being modified is alternatively the sample of rank immediately below [(X_{2n-1})] or immediately above [(X_{2n+1})] the adjacent even sample.

41. (Amended) [Filtering] A digital filtering device according to [any one of Claims] Claim 35 [to 40], [characterised in that it also has] further comprising additional filtering means including means for [of] weighting by [means of] a [sixth] third weighting coefficient [(γ)].

42. (Amended) [Filtering] A digital filtering device according to [the preceding claim] Claim 41, [characterised in that] wherein the [sixth] third weighting coefficient [(γ)] is a function of the weighting coefficient used downstream of said additional filtering means, as follows:

$$\gamma = -1 / \left(2\beta_{0,L_0-1}\right)$$

where γ designates the [sixth] third weighting coefficient, L_0 is a predetermined parameter and β_{0,L_0-1} designates the weighting coefficient used downstream of said additional filtering means.

43. (Amended) [Filtering] A digital filtering device according to [any one of Claims] Claim 35 [to 42], [characterised in that] wherein the digital output signal [(X_n)] represents an image.

44. (Amended) [Filtering] A digital filtering device according to [any one of Claims] Claim 26 [to 43] or 35, [characterised in that] wherein said modification means [have] has means for applying an approximation function [(R)].

45. (Amended) [Filtering] A digital filtering device according to [the preceding claim, characterised in that] Claim 44, wherein the approximation function [(R)] is [the] an identity function.

46. (Amended) [Filtering] A digital filtering device according to Claim 44, [characterised in that] wherein the approximation function [(R)] is a function of a real variable which supplies the integer closest to the variable.

47. (Amended) [Filtering] A digital filtering device according to Claim 44, [characterised in that] wherein the approximation function [(R)] is a function of a real variable which supplies the first integer below the variable.

48. (Amended) [Filtering] A digital filtering device according to Claim 44, [characterised in that] wherein the approximation function [(R)] is a function of a real variable which supplies the first integer above the variable.

49. (Amended) [Filtering] A digital filtering device according to Claim 44, [characterised in that] wherein the approximation function [(R)] is a function of a variable decomposed into sub-variables whose sum is equal to the variable, which supplies a sum of approximate values of the sub-variables, each of the approximate values of the sub-variables being[,] either (i) a function of a real variable which supplies the integer closest to the variable, (ii) [or] a function of a real variable which supplies a first integer below the variable, or (iii) a function of a real variable which supplies the first integer above the variable.

50. (Amended) [Signal] A signal processing device [(2, 5), characterised in that it includes] comprising a digital filtering device according to [any one of Claims] Claim 26 [to 49] or 35.

51. (Amended) [Signal] A signal processing device [(2, 5) including] comprising at least two digital filtering devices according to [any one of Claims] Claim 26 [to 49] or 35, the output signal of one of the digital filtering devices being the input signal of the other digital filtering device.

52. (Amended) [Digital] A digital apparatus[, characterised in that it includes] comprising a signal processing device according to [any one of Claims] Claim 25[, 50 and 51].

53. (Amended) [Digital] A digital photographic apparatus[, characterised in that it includes] comprising a signal processing device according to [any one of Claims] Claim 25[, 50 and 51].

54. (Amended) [Encoding] An encoding method[, characterised in that it includes] comprising steps adapted to implement a filtering method according to [any one of Claims] Claim 1 [to 24] or 10.

55. (Amended) [Encoding] An encoding device[, characterised in that it includes] comprising at least one filtering device according to [any one of Claims] Claim 26 [to 49] or 35.

56. (Amended) [Digital] A digital compression method[, characterised in that it includes] comprising steps adapted to implement a filtering method according to [any one of Claims] Claim 1 [to 24] or 10.

57. (Amended) [Digital] A digital signal compression device[, characterised in that it includes] comprising at least one filtering device according to [any one of Claims] Claim 26 [to 49] or 35.

58. (Amended) An information storage means[, possibly removable,] which can be read by a computer or by a microprocessor, and which stores a program, [characterised in that it comprises] comprising means adapted to implement a filtering method according to [any one of Claims] Claim 1 [to 24] or 10.

59. (Amended) A computer program product[, characterised in that it contains sequences of instructions] comprising code for implementing a filtering method according to [any one of Claims] Claim 1 [to 24] or 35.

60. (New) A digital apparatus comprising a signal processing device according to Claim 50.

61. (New) A digital photographic apparatus comprising a signal processing device according to Claim 50.

62. (New) A digital apparatus comprising a signal processing device according to Claim 51.

63. (New) A digital photographic apparatus comprising a signal processing device according to Claim 51.

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